

WHAT IS CLAIMED IS:

1. An exhaust gas cleaning system for an internal combustion engine, the exhaust gas cleaning system comprising:

a particulate filter, which is fixedly held by a holding member in a metallic case disposed in an exhaust pipe of the engine and collects particulate matters included in exhaust gas, wherein

the particulate filter is formed of a monolithic structural body having a multiplicity of cells provided by porous walls in parallel with flow of the exhaust gas,

the particulate filter has a particulate matter collecting area having wall flow structure, in which the cells are blocked alternately with filler on an exhaust gas inlet side or an exhaust gas outlet side of the particulate filter, and a peripheral heat-retaining layer, which is formed by blocking the cells in a peripheral area extending inward from a peripheral surface of the monolithic structural body by a predetermined width so that the peripheral heat-retaining layer continuously surrounds a periphery of the particulate matter collecting area, and

the predetermined width of the peripheral heat-retaining layer ranges from 5 to 20 millimeters.

2. The exhaust gas cleaning system as in claim 1, wherein

the monolithic structural body has a peripheral skin portion providing a peripheral wall of the monolithic structural body,

the peripheral surface of the monolithic structural body serves as a peripheral surface of the peripheral skin portion, and

the peripheral skin portion has thickness in a range from 0.2 to 1.0 millimeter.

3. The exhaust gas cleaning system as in claim 1, wherein the heat-retaining layer is formed by blocking the entire cells in the peripheral area, which extends inward from the peripheral surface of the monolithic structural body by the predetermined width, on both the exhaust gas inlet side and the exhaust gas outlet side of the monolithic structural body.

4. The exhaust gas cleaning system as in claim 1, wherein the peripheral heat-retaining layer is formed by blocking the entire cells in the peripheral area, which extends inward from the peripheral surface of the monolithic structural body by the predetermined width, on the exhaust gas inlet side of the monolithic structural body.

5. The exhaust gas cleaning system as in claim 1, wherein the peripheral heat-retaining layer is formed by blocking the entire cells in the peripheral area, which extends inward from the peripheral surface of the monolithic structural body by the predetermined width, on the exhaust gas outlet side of the monolithic structural body.

6. The exhaust gas cleaning system as in claim 1, wherein the peripheral heat-retaining layer is formed by blocking the cells, which are completely or partially included in the peripheral area.

7. The exhaust gas cleaning system as in claim 1, wherein the width of the peripheral heat-retaining layer is partially changed in accordance with temperature increasing characteristics at respective peripheral portions of the monolithic structural body.

8. The exhaust gas cleaning system as in claim 1, wherein the monolithic structural body is formed so that a ratio of an area occupied by a layer of air per unit cross-sectional area of the monolithic structural body is higher in the peripheral heat-retaining layer than in the particulate matter collecting area.

9. The exhaust gas cleaning system as in claim 8, wherein the monolithic structural body is formed so that a cell pitch of the cell is greater in the peripheral heat-retaining layer than in the particulate matter collecting area.

10. The exhaust gas cleaning system as in claim 8, wherein the cell in the peripheral heat-retaining layer is formed in a shape different from the shape of the cell in the particulate matter collecting area.

11. An exhaust gas cleaning system for an internal combustion engine, the exhaust gas cleaning system comprising:

a particulate filter, which is fixedly held by a holding member in a metallic case disposed in an exhaust pipe of the engine and collects particulate matters included in exhaust gas, wherein

the particulate filter is formed of a monolithic structural body having a multiplicity of cells provided by porous walls in parallel with flow of the exhaust gas,

the particulate filter has a particulate matter collecting area having wall flow structure, in which the cells are blocked alternately with filler on an exhaust gas inlet side or an exhaust gas outlet side of the monolithic structural body, and a cylindrical peripheral heat-retaining layer, which is formed in a peripheral area extending inward from a peripheral surface of the monolithic structural body by a predetermined width and continuously surrounds a periphery of the particulate matter collecting area,

the peripheral heat-retaining layer has structure of ceramic foam in an internal portion thereof, the ceramic foam structure having a higher air content than a peripheral surface portion of the peripheral heat-retaining layer, and

the predetermined width of the peripheral heat-retaining layer ranges from 5 to 20 millimeters.

12. An exhaust gas cleaning system for an internal

combustion engine, the exhaust gas cleaning system comprising:

a particulate filter, which is fixedly held by a holding member in a metallic case disposed in an exhaust pipe of the engine and collects particulate matters included in exhaust gas, wherein

the particulate filter is formed of a monolithic structural body having a multiplicity of cells provided by porous walls in parallel with flow of the exhaust gas,

the particulate filter has wall flow structure, in which the cells are blocked alternately with filler on an exhaust gas inlet side or an exhaust gas outlet side of the monolithic structural body, and

the holding member has a predetermined thickness and covers an area of 50 to 100 percent of a peripheral surface of the particulate filter in order to form a peripheral heat-retaining layer around the peripheral surface of the particulate filter.

13. The exhaust gas cleaning system as in claim 12, wherein the holding member expands to fasten the particulate filter in the metallic case when the holding member is heated and becomes 5 to 20 millimeters thick after the holding member is mounted to the exhaust gas cleaning system.

14. An exhaust gas cleaning system for an internal combustion engine, the exhaust gas cleaning system comprising:

a particulate filter, which is fixedly held by a holding

member in a metallic case disposed in an exhaust pipe of the engine and collects particulate matters included in exhaust gas, wherein

the particulate filter is formed of a monolithic structural body having a multiplicity of cells provided by porous walls in parallel with flow of the exhaust gas,

the particulate filter has a particulate matter collecting area having wall flow structure, in which the cells are blocked alternately with filler on an exhaust gas inlet side or an exhaust gas outlet side of the monolithic structural body, and a peripheral heat-retaining layer, which is formed by blocking the cells in a peripheral area extending inward from a peripheral surface of the monolithic structural body by a predetermined width and continuously surrounds a periphery of the particulate matter collecting area, and

the monolithic structural body is formed so that a ratio of an area occupied by a layer of air per unit cross-sectional area of the monolithic structural body is higher in the peripheral heat-retaining layer than in the particulate matter collecting area.